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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/666,626	09/18/2003	David R. Mekala	58446US002	9235

32692 7590 07/17/2008

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EXAMINER	
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ART UNIT	PAPER NUMBER
1795	

NOTIFICATION DATE	DELIVERY MODE
07/17/2008	ELECTRONIC

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BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Application Number: 10/666,626
Filing Date: September 18, 2003
Appellant(s): MEKALA ET AL.

Philip Y. Dahl
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed 5/7/08 appealing from the Office action mailed 6/13/07.

(1) Real Party in Interest

A statement identifying by name the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The statement of the status of claims contained in the brief is correct.

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct.

(6) Grounds of Rejection to be Reviewed on Appeal

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

WO 03/058743 A2	BARTON et al	7-2003
JP 11-045733	NAGAMORI et al	2-1999
WO 02/22952 A2	SEGIT et al	3-2002

6,083,638 TANIGUCHI et al 7-2000

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claims 1-4, 6, and 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Barton et al (WO 03/058743). The Barton reference discloses a gas diffusion backing comprising a porous carbon paper "1" impregnated with a first fluorinated polymer as a first layer and a microporous layer "5" of a second fluorinated polymer which contains carbon particles wherein the first fluorinated polymer is hydrophobic and the second fluorinated polymer is hydrophilic (See page 7, lines 8-19 and Figure 1). It also discloses a hydrophobic layer "1" that has a thickness of about 180 microns and a hydrophilic layer "5" that has a thickness of about 1 to 100 microns (See page 14, lines 18-19 and page 17, lines 27-30). It also discloses an intermediate layer between the carbon paper and the microporous layer (See page 8, lines 19-22). It also discloses a fuel cell catalyst layer "7" in contact with the hydrophilic layer "5" (See Figure 2 and page 15, lines 15-32). It also discloses that in general, thinner coatings of the hydrophilic layer "5" will promote mass transport across the coating (See page 14, lines 32-33). It also discloses that routine experimentation is employed to optimize the hydrophilic layer "5" for a particular application (See page 15, lines 4-5).

However, Barton et al does not expressly teach a hydrophilic surface layer that has a thickness of no more than 0.5 micron. However, it has been held that the discovery of an optimum value of a result effective variable by routine experimentation

in a known process is ordinarily within the skill of the art (*In re Boesch*, 205 USPQ 215 (CCPA 1980)).

Examiner's note: As disclosed in the Barton reference, the thickness of the hydrophilic layer is recognized in the art as a results effective variable that promotes mass transport across the layer.

Claims 5-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Barton et al (WO 03/058743). The Barton reference is applied to claims 1, 2, and 4 for reasons stated above.

However, Barton et al does not expressly teach a third layer comprising a carbon fiber construction coated with a fluoropolymer.

However, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the Barton gas diffusion backing to include a third layer comprising a carbon fiber construction coated with a fluoropolymer that is identical to the second layer because duplication of parts was held to have been obvious (*In re Harza* 124 USPQ 378 (CCPA 1960)). Moreover, the reference discusses an intermediate layer (See page 8, line 18-22).

Claims 8-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Barton et al (WO 03/058743) as applied to claim 1 above, and further in view of Nagamori et al (JP 11-045733).

However, Barton et al does not expressly teach a hydrophilic surface layer comprising functional groups containing Si, a metal, or Si and O. The Nagamori

reference discloses a hydrophilic layer "6" of a gas diffusion electrode that contains SiO_2 and Al_2O_3 as the ingredient of a hydrophilic property (See paragraph [0028]).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the Barton gas diffusion backing to include a hydrophilic surface layer comprising functional groups containing Si, a metal, or Si and O in order to maintain the optimum moisture content of the electrolyte membrane and improve the performance of the fuel cell.

Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Barton et al (WO 03/058743) as applied to claim 1 above, and further in view of Segit et al (WO 02/22952).

However, the Barton reference does not expressly disclose a roll good comprising the fuel cell gas diffusion layer. The Segit reference discloses a fuel cell electrode substrate that is flexible and can be made as roll goods (See Abstract).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the Barton gas diffusion backing to include a roll good comprising the fuel cell gas diffusion layer in order to manufacture the gas diffusion layer by a continuous, high volume manufacturing process that permits wide variability in different properties of the gas diffusion layer.

Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Barton et al (WO 03/058743) as applied to claim 1 above, and further in view of Taniguchi et al (US 6083638).

However, Barton et al does not expressly disclose a hydrophilic surface layer that is present on less than all of the hydrophobic second layer, according to a pattern. The Taniguchi reference discloses a hydrophilic layer "203" that is present on less than all of the hydrophobic layer "202", according to a pattern (See Figure 6(b) and column 12, lines 49-53).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the Barton gas diffusion backing to include a hydrophilic surface layer that is present on less than all of the hydrophobic second layer, according to a pattern in order to prevent water from collecting in the gas flow channels while maintaining proper moisture levels in the electrode layers.

(10) Response to Argument

The appellant argues that Barton teaches a very broad range of values for the hydrophilic layer (1-100 microns) and a very broad range of preferred values for the hydrophilic layer (8-16 microns). The appellant further argues that the present claim limitation (0.5 micron) lies well outside both of the broad ranges recited in Barton for that variable and the recitation of the preferred range in Barton is a clear teaching away from the present claim limitation and the present invention.

The examiner disagrees with the appellant's assumption that Barton clearly teaches away from the present claim limitation. The Barton reference expressly teaches that thinner coatings (hydrophilic surface layer) will promote mass transport across the coating (See page 14, lines 32-33). It also expressly teaches that there will be a need to employ routine experimentation to optimize the microporous layer 5 (hydrophilic surface layer) for a particular application (See page 15, lines 4-5). Based upon the teachings of the Barton reference, the examiner contends that it would have been obvious to one of ordinary skill in the art to optimize the thickness of the hydrophilic surface layer by routine experimentation in order to more efficiently promote mass transport across that layer. In addition, there is no evidence of the criticality of the claimed range of the thickness of the hydrophilic layer.

The appellant also argues that while the present claims contain no process limitations and are not limited to the use of any process in particular, it does not appear that the very thin hydrophilic surface layer required in the present claims is enabled in Barton. Firstly, this argument appears to be a statement of the appellant's opinion and

not based on any factual evidence. Secondly, there is no evidence to show that the rod coating process taught by Barton is not capable of forming a layer that has a thickness of 0.5 micron. Thirdly, one of ordinary skill in the art would know that it is necessary to utilize a process that is capable of forming a 0.5 micron thick layer in order to form the thinner layer.

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

/Tony Chuo/

Examiner, Art Unit 1795

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